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NEW EPHEMERIDAE FROM NEW ENGLAND.¹

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THE study of a small but interesting collection of Ephemeroidea submitted to me for identification by Mr. C. W. Johnson of the Boston Society of Natural History has resulted in the discovery of several undescribed species, descriptions of which are herewith presented.

Leptophlebia johnsoni, sp. nov.

Male.—Head and thorax rather bright black-brown, especially laterally. Abdomen with segments 2-7 translucent white, segment 2 tinged with pale brownish; spiracles marked by small black dots with faint brown shades above them; segments 8-10 (and often the posterior dorsal portion of 7) opaque, dorsally brown; segment 9 edged laterally with pale creamy, ventrally segment 8 pale creamy, segment 9 pale brown; forceps pale creamy with light-brown subgenital plate; setae white, narrowly ringed with brown; a medio-ventral row of light-brown patches on hyaline segments. Fore legs deep brown, with tip of tibia darker, four posterior legs pale golden brown. Wings hyaline with a faint but distinct pale umber shade in the apical area of fore wing; venation faint with the veins and cross-veins of apical area brownish.

Female.—Deep brown with red-brown shading on vertex of head; legs paler brown. Last ventral segment bilobed, the lobes pointed but the excavation between them rather shallow (less than half the length of segment) and gently rounded apically. Wings without apical cloud. Length of body and fore wing 7 mm.

Holotype.—♂, Jaffrey, New Hampshire, June 21 (C. W. Johnson); in the collection of the Boston Society of Natural History.

Allotype.—♀, Jaffrey, New Hampshire, June 25, in the same collection.

Paratypes.—2♂, same data as holotype; No. 772, in the Canadian National Collection, Ottawa.

Apart from the apical cloud on the primaries of the male, the species is readily distinguished from *L. mollis* and its allies by the form of the male genitalia (Pl. 6, fig. 1).

Ephemerella temporalis, sp. nov.

Male.—Eyes (living) ferruginous yellow; head deep yellowish; thorax rather bright brown, slightly olivaceous dorsally, with a paler, orange-yellow streak from the wing roots to pronotum and with pale creamy shades on the pleura at the base of the wings. Abdomen dorsally with segments 2-7 deep brown,

¹ Contribution from the Division of Systematic Entomology, Entomological Branch, Department of Agriculture, Ottawa, Canada.

segments 8 and 9 ruddy brown and segment 10 paler, yellow brown; segments 2-4 with blackish posterior margins; a faint, brown, mediodorsal line, partially geminate on the anterior segments; on the anterior margin of the first eight segments are two small blackish subdorsal dots, frequently surrounded by faint pale shades; the lateral margin of segments 8 and 9 is narrowly yellowish bordered above by a faint blackish line and there are frequently slight blackish markings in the spiracular area. Ventrally pale whitish yellow, posterior segments more opaque than the anterior ones which are shaded laterally slightly with brownish; segments 4-7 with medioventral brown ganglionic blotches; two small black dots on each side of the median line about the center of each segment and a similar lateral one, slightly in advance of these in position; forceps pale ochreous; setae whitish with distinct brown rings. Legs yellow, shading into dirty white on the tibiae, the joints of which are marked with blackish; claws black; there is frequently a dark dot at apex of femora. Wings hyaline, costal veins slightly yellowish at base of primaries, otherwise all veins colorless.

Female.—Paler and more olivaceous in general coloring than the ♂; head yellow with black dots in lower corners next the eyes and slight black markings at bases of antennae and on vertical carina, vertex with central blackish shading and with two ruddy spots each side of the median line, the inner one often obscured by the dark shading; abdominal maculation much as in ♂, the mediodorsal line extending forward on to the rear portion of mesothorax. Length of body 8 mm.; of fore wing 8-10 mm.

Holotype.—♂, Ottawa, Ontario, July 4 (C. H. Curran); No. 778, in the Canadian National Collection, Ottawa.

Allotype.—♀, same data.

Paratypes.—1 ♂, 1 ♀, same data; 1 ♂, Hogs Back, Rideau River, Ontario, June 22 (R. H. Osburn); 3 ♂, Algonquin Park, Ontario, June 18 (J. McDunnough); 2 ♂, North Reading, Massachusetts, June 10 (C. W. Johnson); the two last in the collection of the Boston Society of Natural History.

Owing to the impossibility at the present time of satisfactorily identifying a number of the described species in this genus, the description of a new species is always attended with a certain amount of risk; it seems, however, advisable to tie our Canadian species definitely down to given names and work out the synonymy at leisure. The present species falls into the same group as *lutulenta* Clem., the types of which are before me. These types are in very poor condition and hard to recognize but they all show a sprinkling of black dots on legs and abdomen, lacking in *temporalis*, and the ♂ besides being apparently more olivaceous in coloration, shows slight genitalic differences, notably in the lack of a small tubercle between the bases of the forceps; this feature seems quite characteristic of the present species. The ♀ also resembles the unique ♀ type of *lineata* Clem., which, however, has a brown dorsal stripe rather than a mere line and has further no ventral maculation; the subanal plate shows a distinct angular excavation apically whilst in *temporalis* this excavation is evenly rounded. The Massachusetts specimens were labelled *excrucians* Walsh but my notes on the genitalia of the specimens in the Museum of Comparative Zoölogy at Cambridge, Massachusetts, seem to indicate a different form.

Siphonurus novangliae, sp. nov.

Male.—Head light brown with a black line below the antennae and along the edge of the vertical carina. Thorax brown, shaded with paler on the lateral anterior portion of the mesonotum and with black streaks anterior to the base of primaries; a light ruddy-brown shade before the posterior mesothoracic protuberance which is also tipped with the same color. Abdomen dorsally deep brown shaded largely with yellow brown on the three posterior segments; in segments 2-7 there are pale yellowish, semitranslucent patches laterally on the anterior portion of each segment. Ventrally segments 1 and 2 are largely brown with a yellow band on posterior margin, the remaining segments yellowish with the three posterior segments suffused with brown; there is also a series of brownish lateral patches, largest and most distinct on the anterior segments, reduced to mere streaks or obsolete on the posterior ones; forceps deep brown with basal plate yellow, especially on interior side. Fore leg brown, paler at base of femur and on coxae and with joints of tarsi marked with black; posterior legs yellow brown with the tip of femur and the tarsal joints slightly marked with brown. Setae dirty gray with black annulation. Wings hyaline with black venation and in certain lights with a very faint amber tinge over the entire surface.

Female.—Very similar to ♂ but slightly paler in coloration. Length of body 13 mm.; of fore wing 13 mm.

Holotype.—♂, Brookline, Massachusetts, June 17 (C. W. Johnson); in the collection of the Boston Society of Natural History.

Allotype.—♀, same data.

Paratypes.—2 ♂, Darien, Connecticut, June 11 (C. W. Johnson); 3 ♀, Brookline, Massachusetts, June 11, 17, in the collection of the Boston Society of Natural History and No. 773 in the Canadian National Collection, Ottawa.

The species should be readily recognized by its ♂ genitalia, the penes being barb-shaped at the base with broad truncate apices (Pl. 6, fig. 3); it is distinguished from *typicus* Eaton, a New England species, by the lack of a brown shade in the axillary fold of the fore wing.

Siphonurus rapidus, sp. nov.

Male.—Face pale grayish with broad dark transverse band below the antennae; thorax dull olive brown with a darker mid-dorsal stripe and ruddy brown shading anterior to and on the mesothoracic posterior tubercle; anterior to the wing roots is a pale whitish-yellow shade containing a deep purple-brown streak. Abdomen dorsally with the first seven segments deep purple brown, the anterior margins of segments 3-7 being semitranslucent pale whitish yellow; the three posterior segments are light brown shaded laterally and anteriorly with pale yellowish. Ventrally pale yellowish with a dark purple brown irregular medioventral stripe; anterior segments largely shaded with purple brown; forceps light smoky with pale yellow basal plate; setae dirty white ringed with blackish. Fore leg pale brownish, hind legs dirty white, with the joints marked with purple brown and in some lights with a faint purplish shade beyond the middle of the femora. Wings hyaline with black venation.

Female.—Rather paler than the ♂ and with the medioventral stripe reduced to series of patches. Length of body 10 mm.; of fore wing 12 mm.

Holotype.—♂, North Reading, Massachusetts, June 10; No. 774, in the Canadian National Collection, Ottawa.

Allotype.—♀, Jaffrey, New Hampshire, June 11; in the collection of the Boston Society of Natural History.

The ♂ type, which has been in the Canadian National Collection for some time, is in poor condition and I should scarcely have ventured to describe the species as new if it had not been for the characteristic genitalia, in which the apices of the penes are drawn out into long narrow points (Pl. 6, fig. 4).

Cinygma bipunctata, sp. nov.

Male.—Almost entirely deep black brown, the ventral surface of the abdomen somewhat paler and with the posterior margin of each segment narrowly bordered with dull whitish, this color on the rear segments extending to the lateral portions of the dorsum. Setae whitish with narrow dark rings. Fore femur deep brown, tibia pale brown, tarsi dirty whitish with joint 1 about two-thirds the length of 2; hind legs dull yellowish, the femora with prominent deep-brown median and apical spots. Wings hyaline with faint brownish tinge at extreme base, the longitudinal veins pale brownish, the cross-veins colorless and very indistinct except in apical area.

Female.—Quite similar to the ♂. Length of body 6 mm.; of fore wing 8 mm.

Holotype.—♂, Wales, Maine, June 18, 1907 (C. A. Frost); in the collection of the Boston Society of Natural History.

Allotype.—♀, Squam Lake, New Hampshire, July 2 (G. M. Allen); in the collection of the Boston Society of Natural History.

Paratype.—♂, same data as allotype; No. 775, in the Canadian National Collection, Ottawa.

The species has a superficial resemblance to *Choroterpes basalis* but the paired intercalaries between the first and second anal veins and the type of genitalia (Pl. 6, fig. 5) clearly indicate the above generic reference. The specimen serving for the slide of the genitalia would appear to have an extra joint in the forceps but I presume that this is an abnormal condition.

EXPLANATION OF PLATE 6.

Male genitalia of: 1.—*Leptophlebia johnsoni*, sp. nov.; 2.—*Ephemerella temporalis*, sp. nov.; 3.—*Siphonurus novangliae*, sp. nov.; 4.—*Siphonurus rapidus*, sp. nov.; 5.—*Cinygma bipunctata*, sp. nov.